CITY OF MONTPELIER (PWS 6040021)
SOURCE WATER ASSESSMENT FINAL REPORT

May 28, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for City of Montpelier, Montpelier, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The City of Montpelier (PWS #6040021) drinking water system consists of three wells, Well #1, Well #2, and Well #3. Well #2 operates as the primary supply source, Well #1 operates during the summer to supply the additional demands due to irrigation, and Well #3 operates as a standby source which is usually taken offline during the winter months. The system currently serves approximately 3000 persons through 1288 connections.

The potential contaminant sources within the delineation capture zones include underground storage tanks (USTs), leaking underground storage tanks (LUSTs), and sites regulated under the Superfund Amendments and Reauthorization Act (SARA), and Resource Conservation Recovery Act (RCRA). Additionally, Highway 30, Highway 89, and a railroad are transportation corridors that cross the delineations. If an accidental spill occurred from any of these corridors, inorganic chemical contaminants, volatile organic chemical contaminants, synthetic organic chemical contaminants, or microbial contaminants could be added to the aquifer system. Other contaminant sources identified that may contribute to the overall vulnerability of the water sources were business within the delineated areas that may be considered potential contaminants sources. A complete list of potential contaminant sources is provided with this assessment (Table 1, 2, and 3).

For the assessment, a review of laboratory tests was conducted using the Idaho Drinking Water Information Management System (DWIMS) and the State Drinking Water Information System (SDWIS). Total coliform bacteria were detected at various locations in the distribution system. Since July 1998, subsequent samples have not detected total coliform bacteria in the distribution system. The inorganic chemicals fluoride, sodium, and nitrate have been detected in the drinking water, but at levels below the maximum contaminant level (MCL) for each chemical. No volatile organic chemicals or synthetic organic chemicals have been detected in the drinking water.

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, i.e. nitrates), volatile organic contaminants (VOCs, i.e.

petroleum products), synthetic organic contaminants (SOCs, i.e. pesticides), and microbial contaminants (i.e. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

In terms of total susceptibility, Well #1 rated high for IOCs, VOCs, SOCs, and microbials. System construction scores were moderate and hydrologic sensitivity scores were high. Potential contaminant source and land use scores were moderate for IOCs, VOCs, SOCs, and low for microbials (Table 4).

In terms of total susceptibility, Well #2 rated automatically high for IOCs, VOCs, SOCs, and microbials. System construction scores were moderate and hydrologic sensitivity scores were high. . Potential contaminant source and land use scores were moderate for IOCs, VOCs, SOCs, and low for microbials. The automatically high ratings were due to the presence of an irrigation pipe and Highway 30 in the sanitary setback distance (50 feet) of the well (Table 4).

In terms of total susceptibility, Well #3 rated automatically high for IOCs, VOCs, SOCs, and microbials. System construction scores were low and hydrologic sensitivity scores were moderate. . Potential contaminant source and land use scores were low for IOCs, moderate for VOCs and SOCs, and low for microbials. The automatic high ratings were due to a sewer pipe under the road and a sewer pipe in the alley within the sanitary setback distance of the well (Table 4).

Well logs were not available for Well #1 and Well #2 during the analysis. Any rating derived from information on a well log automatically defaulted to a higher score. If the well logs would have been available, each well's system construction and hydrologic sensitivity scores might have been lower.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the City of Montpelier, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Land uses within most of the source water assessment area are outside the direct jurisdiction of City of Montpelier, collaboration and partnerships with state and local agencies and industry groups should be established and are critical to success. Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations are near urban and residential land uses areas. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. There are transportation corridors near the delineations, therefore the Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Caribou County Soil Conservation and Water District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR THE CITY OF MONTPELIER, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

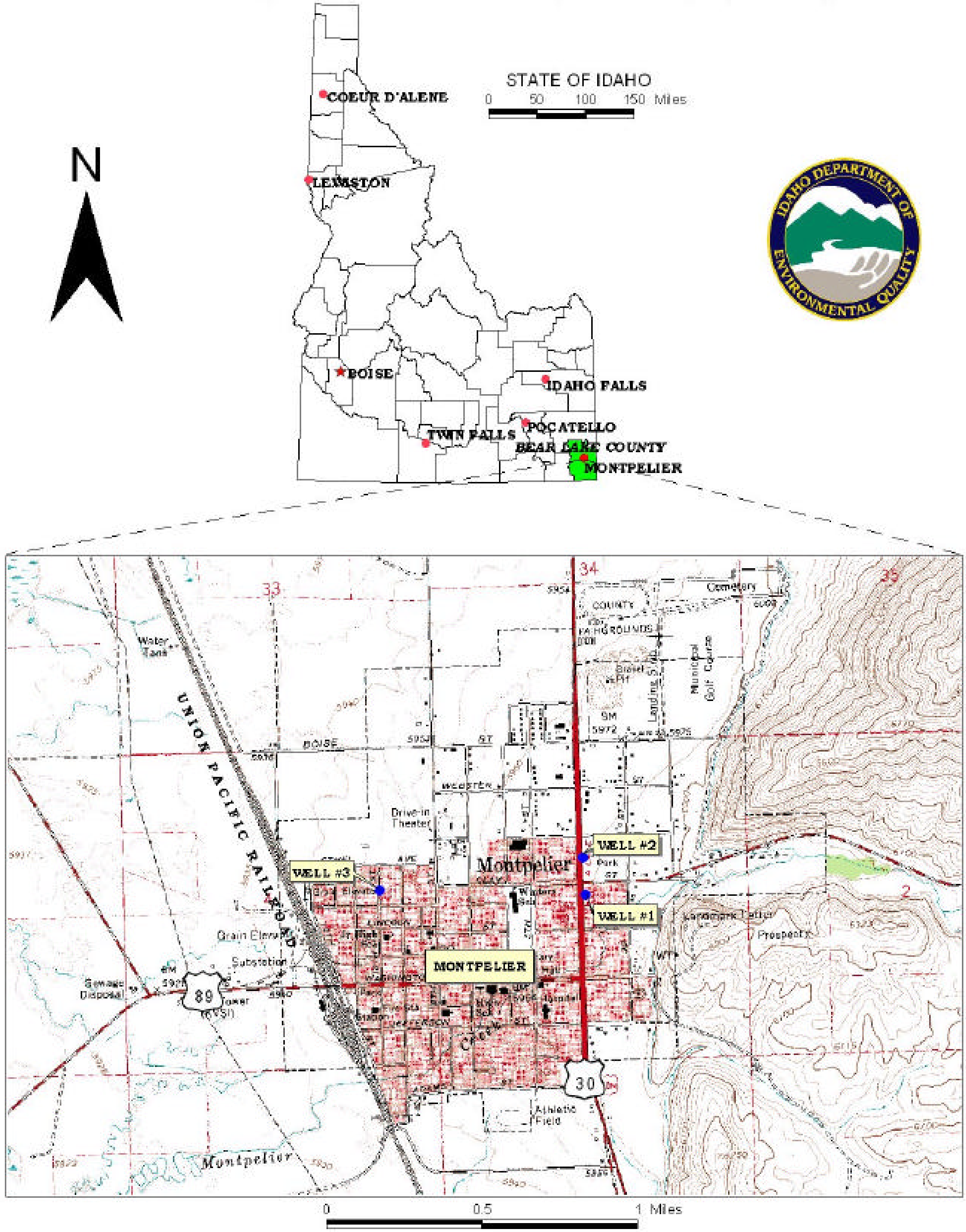
The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The City of Montpelier (PWS #6040021) drinking water system consists of three wells, Well #1, Well #2, and Well #3 that provide drinking water to approximately 3000 persons. Well #2 operates as the primary supply source, Well #1 operates during the summer to supply the additional demands due to irrigation, and Well #3 operates as a standby source which is usually taken offline during the winter months. The inorganic chemicals (IOCs), fluoride, sodium, and nitrate represent the main water chemistry constituents recorded in the public water system, although the reported concentrations of these chemicals were below the maximum contaminant level (MCL) for each chemical, as set by the EPA. Total coliform bacteria were detected at various locations in the distribution system.

FIGURE 1. Geographic Location of the City of Montpelier



Since July 1998, subsequent samples have not detected total coliform bacteria in the distribution system. Water chemistry tests have not detected synthetic organic contaminants (SOCs) in the drinking water.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. Washington Group International (WGI) was contracted by DEQ to define the public water system's zones of contribution. WGI used a conceptual computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Bear River - Dingle Swamp hydrologic province in the vicinity of the City of Montpelier. The computer model used site specific data, assimilated by WGI from a variety of sources including operator records, well logs (when available) and hydrogeologic reports. A summary of the hydrogeologic information from the WGI is provided below.

Hydrogeologic Conceptual Model

The Bear River originates in the Uinta Mountains of northern Utah and winds its way through over 500 miles of Wyoming, Idaho, and Utah to terminate in a freshwater bay of the Great Salt Lake just 90 miles west of its source (Dion, 1969, p. 6). The Bear River enters Idaho near Border, Wyoming and flows along the north edge of the Bear River Plateau. Flowing north through the Bear River – Dingle Swamp hydrologic province, it passes into the Soda Springs hydrologic province east of the Bear River Range. Upon entering the Gem Valley – Gentile Valley hydrologic province, it swings south. Now west of the Bear River Range, the river passes through the Oneida Narrows into the Cache Valley hydrologic province. Over most of its course through Idaho, the Bear River is gaining and in direct hydraulic communication with the major aquifer systems of the four hydrologic provinces. The exception is a small reach between the cities of Alexander and Grace where it is generally losing and is perched over the regional fractured basalt aquifer (Dion, 1969, p. 30).

Ground water in the Bear River Basin is found in Holocene alluvium, Pleistocene basalt, and rocks of the “Pliocene (?)” [sic] Salt Lake Formation, pre-Tertiary undifferentiated bedrock, and possibly the “Eocene (?)” [sic] Wasatch Formation (Dion, 1969, pp. 15 and 16). Rocks of the Salt Lake Formation, which include freshwater limestone, tuffaceous sandstone, rhyolite tuff and poorly-consolidated conglomerate, outcrop along the major valley margins and may underlie the valley-fill alluvium (Dion, 1969, pp. 16 and 17). Many of the wells drilled into this formation do not yield water. The few wells that do produce water yield as much as 1,800 gal/min from beds of sandstone and conglomerate.

The Wasatch Formation is restricted to the Bear Lake Plateau and small areas northwest of Bear Lake (Dion, 1969, p. 17 and Figure 6). The formation is composed largely of tightly cemented conglomerate and sandstone with smaller amounts of shale, limestone, and tuff. The primary pore space is typically impermeable. Water movement may occur through joints and fractures or more permeable zones that are thought to exist along the relatively flat-lying formation (Dion, 1969, p. 17). Springs occur at the margins of the formation.

Precipitation in the basin ranges from 10 in./yr on the floor of Bear Lake Valley to over 45 in./yr on the Bear River Range (Dion, 1969, pp. Vll and 11). Applied over the entire basin, precipitation amounts to approximately 2.3 million acre-feet annually. Precipitation is also the principal source of recharge to the basin's aquifers in conjunction with spring snowmelt and runoff, irrigation seepage, and canal losses.

Natural ground water discharge is by flow to the Bear River, springs, seeps along river banks, and evapotranspiration in large marshy areas (Dion, 1969, p. VIII). Some discharge may also occur by way of underflow to the Portneuf River drainage through basalt flows at Tenmile pass and near Soda Point.

Ground water is obtained from both springs and wells in the Bear River Basin. Hundreds of springs issue primarily from fractures and solution openings in the bedrock on the margins of the basin (Dion, 1969, p. 47). Water production from wells in the four hydrologic provinces is primarily from alluvial and basalt aquifers; however, some wells tap conglomerate, sandstone, limestone and shale aquifers of the Salt Lake and possibly the Wasatch formations (Dion, 1969, p. VII).

Bear River – Dingle Swamp

The Bear River – Dingle Swamp hydrologic province occupies approximately 280 square miles in the southeast corner of Idaho. The Basin and Range physiographic province is north to south trending and is bounded on the east by the Bear Lake Plateau and on the west by the Bear River Range. These mountains are composed of pre-Tertiary undifferentiated quartzite and sedimentary rocks (Dion, 1969, p. 18).

The Bear Lake Valley is filled with alternating layers of Quaternary clay, silt, sand, and gravel. The maximum thickness is unknown, yet it may be as great as several thousand feet (Dion, 1969, p.15). The sand and gravel layers are the principal water-producing units. The valley floor ranges in elevation from 5,923 feet above mean sea level (msl) at Bear Lake to 5,914 ft msl at a gauging station on the Bear River near Bennington. The southern end of the valley is almost completely filled by Bear Lake and Dingle Swamp leaving little room for development. Annual precipitation at Montpelier averaged 14 inches from 1922 to 1966 and averages over 45 in./yr on the Bear River Range (Dion, 1969, pp. 10-11).

The primary source of recharge to the valley-fill aquifer is from stream flow over alluvium near the valley margins (Dion, 1969, p. 18). Water issuing from older sedimentary rock at the bedrock/valley-fill contact also provides significant recharge to the valley fill. Precipitation on the valley floor, canal leakage, and applied irrigation water are other sources of aquifer recharge.

Natural discharge of ground water occurs as river gains along the Bear River and as evapotranspiration from Dingle Swamp where the water table is at land surface.

Ground water flow direction is to the Bear River (Dion, 1969, Figure 7). The valley-fill aquifer is generally unconfined, although perched and artesian conditions are known to occur. The alluvial aquifer is hydraulically connected to the Bear River over most of its length in the valley (Dion, 1969, p. 25).

Estimates of hydraulic conductivity are based on analysis of specific capacity data presented by Dion (1969, Table 7) and in PWS well driller's logs. Estimates range from 13 to 373 ft/day, with a geometric mean of 115 ft/day.

The delineated source water assessment areas for the City of Montpelier wells can best be described as a north-northeast trending lobes approximately 2 miles long and ¾miles wide (Figures 2, 3, 4). The capture zones for Well #1 and Well #2 were truncated based on topographical relief and the location of the bedrock/alluvium contact as defined by Johnson and Raines (1996). The actual data used by WGI in determining the source water assessment delineation areas are available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases identified potential contaminant sources within the delineation areas. Some of these sources include underground storage tanks (USTs), leaking underground storage tanks (LUSTs), and sites regulated under the Superfund Amendments and Reauthorization Act (SARA), and Resource Conservation Recovery Act (RCRA).

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in March and April 2002. The first phase involved identifying and documenting potential contaminant sources within the City of Montpelier source water assessment areas through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the delineated areas. This task was undertaken with the assistance of Mr. Don Toomer. At the time of the enhanced inventory, an additional potential contaminant source was found within the delineated source water area. Maps with well locations, delineated areas and potential contaminant sources are provided with this report (Figure 2, 3, 4). Each potential contaminant source has been given a unique site number that references tabular information associated with the public water wells (Tables 1, 2, 3).

Table 1. City of Montpelier, Well #1, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
1	Gas Station; Closed, UST site	0-3	Database Search	VOC, SOC
2	Gas Station; Open, UST site	0-3	Database Search	VOC, SOC
3	Federal Non-Military; Closed, UST site	0-3	Database Search	VOC, SOC
4	Not Listed; Open, UST site	0-3	Database Search	VOC, SOC
5	Utilities; Closed, UST site	0-3	Database Search	VOC, SOC
6, 12	Service Stations-Gasoline & Oil, UST site	0-3	Database Search	IOC, VOC, SOC
7	Truck-Repairing & Service	0-3	Database Search	IOC, VOC, SOC
8	Veterinarians	0-3	Database Search	IOC, SOC, Microbials
9	Engines-Gasoline	0-3	Database Search	IOC, VOC, SOC
10	Automobile Repairing & Service	0-3	Database Search	IOC, VOC, SOC
11	General Contractors	0-3	Database Search	None
13	Automobile Dealers-New Cars	0-3	Database Search	IOC, VOC, SOC
14	Veterinarians	0-3	Database Search	IOC, SOC, Microbials
15	Tire-Dealers-Retail	0-3	Database Search	IOC, VOC, SOC
16	Automobile Parts & Supplies-Retail	0-3	Database Search	IOC, VOC, SOC
17	Oils-Lubricating-Wholesale	0-3	Database Search	IOC, VOC, SOC
18	Government-Forestry Services	0-3	Database Search	IOC, VOC, SOC
19	Electric Companies	0-3	Database Search	IOC, VOC
20	Other; Closed, UST site	3-6	Database Search	VOC, SOC
21	Gas Station; Closed, UST site	3-6	Database Search	VOC, SOC
22	Gas Station; Open, UST site	3-6	Database Search	VOC, SOC
23	Gas Station; Closed, UST site	3-6	Database Search	VOC, SOC
24	Hardware-Retail	3-6	Database Search	IOC, VOC, SOC
25	Golf Courses-Public	3-6	Database Search	IOC, SOC
26	Campgrounds	3-6	Database Search	IOC, VOC, SOC
27	RCRA site	3-6	Database Search	IOC, VOC, SOC
28	SARA site	3-6	Database Search	VOC,
29	SARA site	3-6	Database Search	, VOC, SOC
30	State Government; Open, UST site	6-10	Database Search	VOC, SOC
31	Hospitals	6-10	Database Search	IOC, SOC
32	Automobile Dealers-Used Cars	6-10	Database Search	VOC, SOC
33	Tire-Dealers-Retail	6-10	Database Search	IOC, VOC, SOC
34	SARA site	6-10	Database Search	IOC, VOC, SOC
	Highway 30	0–10	GIS Map	IOC, VOC, SOC, Microbials
	Highway 89	6–10	GIS Map	IOC, VOC, SOC

[1] RCRA = Resource Conservation and Recovery Act, SARA =Superfund Amendments and Reauthorization Act., LUST site = Leaking Underground Storage Tank, UST site = Underground Storage Tank.
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 2. City of Montpelier, Well #2, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone (years)[2]	Source of Information	Potential Contaminants[3]
1	Veterinarians	0-3	Database Search	IOC, SOC, Microbials
2	General Contractors	0-3	Database Search	IOC, VOC, SOC
3	Veterinarians	0-3	Database Search	IOC, SOC, Microbials
4	Campgrounds	0-3	Database Search	IOC, VOC, SOC
5	RCRA site	03-	Database Search	IOC, VOC, SOC
6	Other; Closed, UST site	3-6	Database Search	VOC, SOC
7	Gas Station; Closed, UST site	3-6	Database Search	VOC, SOC
8	Truck-Repairing & Service	3-6	Database Search	IOC, VOC, SOC
9	Golf Courses-Public	6-10	Database Search	IOC, SOC
10	State Government; Open, UST site	6-10	Database Search	VOC, SOC
11	Roofing Contractors	6-10	Database Search	IOC, VOC, SOC
12	SARA site	6-10	Database Search	IOC, VOC, SOC
13	SARA site	6-10	Database Search	IOC, VOC, SOC
	Highway 30	0–10	GIS Map	IOC, VOC, SOC, Microbials
	Highway 89	6–10	GIS Map	IOC, VOC, SOC

[1] RCRA = Resource Conservation and Recovery Act, SARA =Superfund Amendments and Reauthorization Act., LUST site = Leaking Underground Storage Tank, UST site = Underground Storage Tank.

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 3. City of Montpelier, Well #3, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone (years)[2]	Source of Information	Potential Contaminants[3]
1	Automobile Repairing & Service	0-3	Database Search	IOC, VOC, SOC
2	Roofing Contractors	0-3	Database Search	IOC, VOC, SOC
3	Fire Departments	0-3	Database Search	IOC, VOC, SOC
4	SARA site	0-3	Database Search	IOC, VOC, SOC
5, 7, 17	Feed-Dealers (Wholesale), LUST site, UST site	3-6	Database Search	VOC, SOC
6	Auto Dealership; Closed, UST site	3-6	Database Search	VOC, SOC
8	Other; Closed, UST site	3-6	Database Search	VOC, SOC
9	Gas Station; Closed, UST site	3-6	Database Search	VOC, SOC
10	Other; Closed, UST site	3-6	Database Search	VOC, SOC
11	Automobile Body-Repairing & Painting	3-6	Database Search	IOC, VOC, SOC
12	Ice Boxes (Manufacturers)	3-6	Database Search	IOC, VOC, SOC
13	Carpet & Rug Cleaners	3-6	Database Search	VOC
14	Hardware-Retail	3-6	Database Search	IOC, VOC, SOC
15	Funeral Directors	3-6	Database Search	IOC, SOC
16	Photographers-Portrait	3-6	Database Search	IOC, VOC
18	RCRA site	3-6	Database Search	IOC, VOC, SOC
19, 22, 31	Automobile Dealers-New Cars, LUST site, UST site	6-10	Database Search	VOC, SOC
20, 26	Railroad; Closed, UST site, LUST site	6-10	Database Search	VOC, SOC

Site #	Source Description[1]	TOT Zone (years)[2]	Source of Information	Potential Contaminants[3]
21	Site Cleanup Incomplete , Impact: ground water: LUST site	6-10	Database Search	VOC, SOC
23, 28	Automobile Parts & Supplies-Retail, UST site	6-10	Database Search	IOC, VOC, SOC
24	Gas Station; Closed, UST site	6-10	Database Search	VOC, SOC
25	State Government; Open, UST site	6-10	Database Search	VOC, SOC
27	Not Listed; Closed, UST site	6-10	Database Search	VOC, SOC
29	Cleaners	6-10	Database Search	VOC
30	Hardware-Retail	6-10	Database Search	IOC, VOC, SOC
32	Automobile Body-Repairing & Painting	6-10	Database Search	IOC, VOC, SOC
33	Automobile Repairing & Service	6-10	Database Search	IOC, VOC, SOC
34	Commercial Printing NEC	6-10	Database Search	IOC, VOC
35	Newspapers (Publishers)	6-10	Database Search	IOC, VOC
36	Automobile Dealers-New Cars	6-10	Database Search	IOC, VOC, SOC
37	Truck Renting & Leasing	6-10	Database Search	VOC, SOC
38	Railroads	6-10	Database Search	IOC, VOC, SOC
39	Automobile Parts & Supplies-Retail	6-10	Database Search	IOC, VOC, SOC
40	RCRA site	6-10	Database Search	IOC, VOC, SOC
41	RCRA site	6-10	Database Search	IOC, VOC, SOC
42	SARA site	6-10	Database Search	IOC, VOC, SOC
	Highway 30	6-10	GIS Map	IOC, VOC, SOC
	Highway 89	6–10	GIS Map	IOC, VOC, SOC
	Railroad	6–10	GIS Map	IOC, VOC, SOC

[1] RCRA = Resource Conservation and Recovery Act, SARA =Superfund Amendments and Reauthorization Act., LUST site = Leaking Underground Storage Tank, UST site = Underground Storage Tank.
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

FIGURE 2. City of Montpelier Delineation Map and Potential Contaminant Source Locations

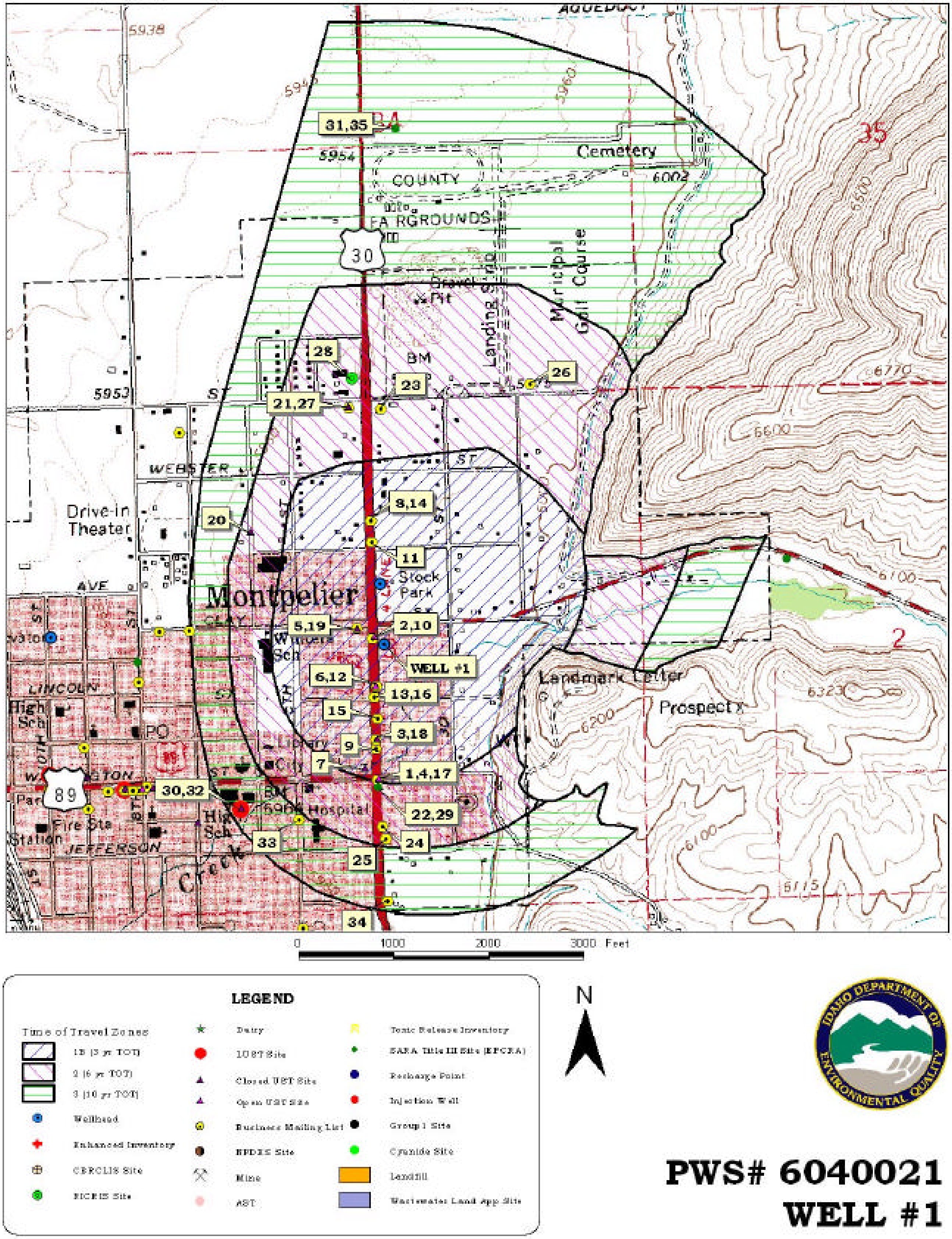
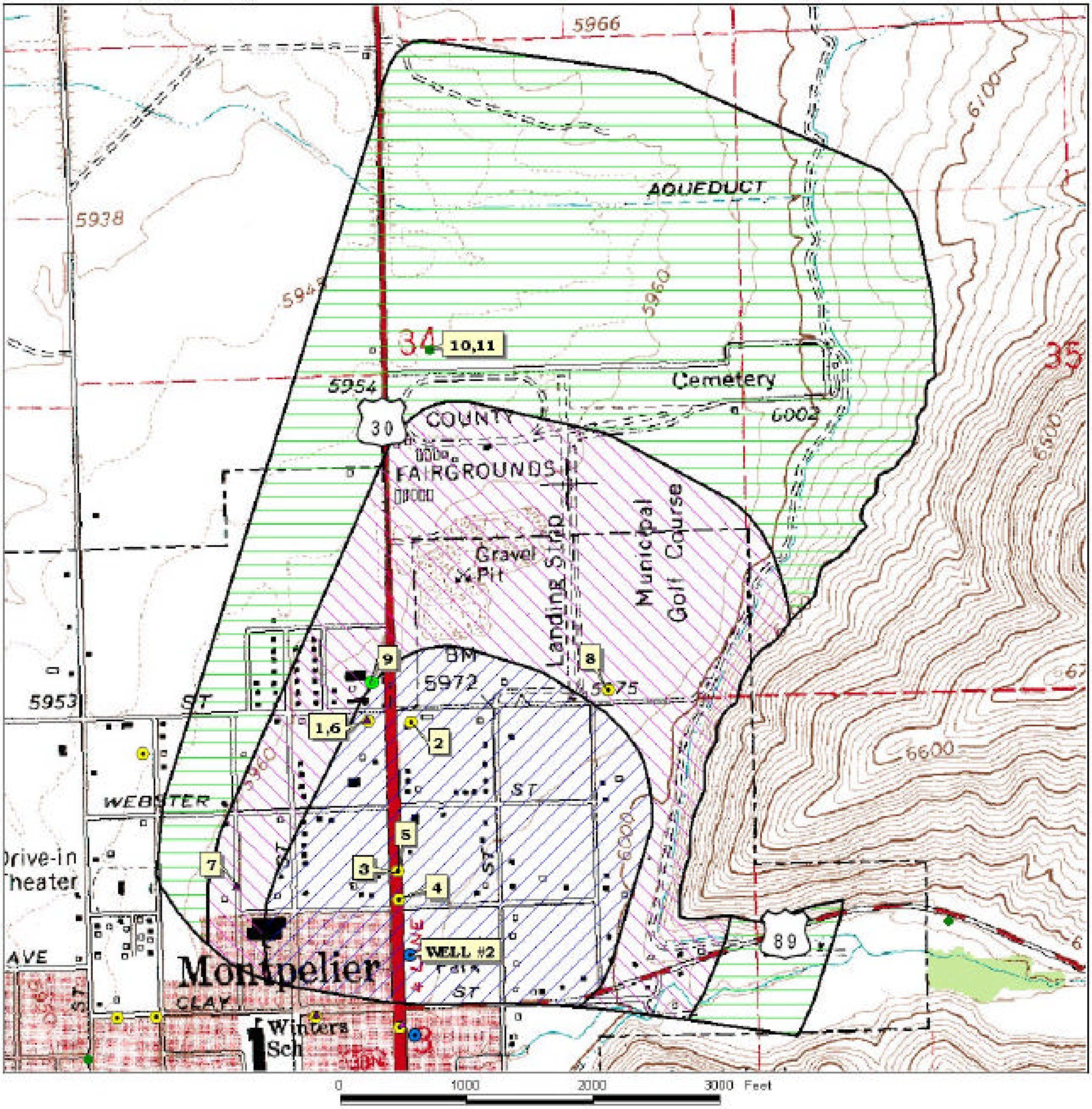
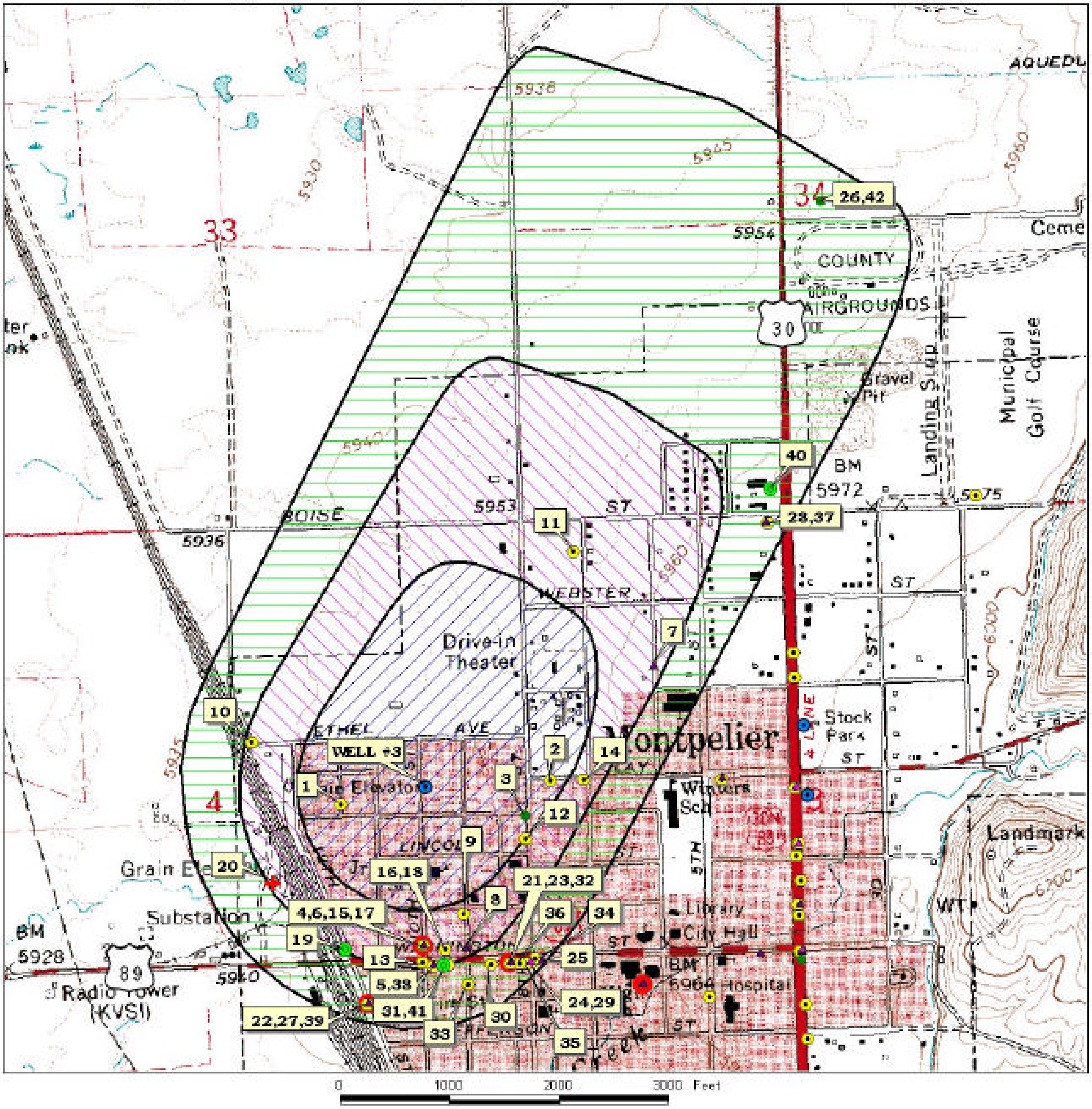


FIGURE 3. City of Montpelier Delineation Map and Potential Contaminant Source Locations



PWS# 6040021
WELL #2

FIGURE 4. City of Montpelier Delineation Map and Potential Contaminant Source Locations



PWS# 6040021
WELL #3

Section 3. Susceptibility Analyses

The wells susceptibility to contamination were ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the wells, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: These factors are surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity was rated high for Well #1 and Well #2, and moderate for Well #3. This is based upon moderate to well drained soil classes as defined by the National Resource Conservation Service (NRCS). Soils that have poor to moderate drainage characteristics have better filtration capabilities than faster draining soils. There was also insufficient well log information (for Well #1 and Well #2) to evaluate the vadose zone composition, the first depth to ground water, and whether there is at least 50 feet of cumulative thickness of low permeability material that helps to reduce the downward movement of contaminants. The well log for Well #3 indicates that the vadose zone is comprised of clay material and gravels and the depth to first ground water is less than 300 feet from the surface. In addition, there is 50 feet cumulative thickness of low permeability material that helps to reduce the downward movement of contaminants.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

The system construction score was rated moderate for Well #1 and Well #2 and low for Well #3. Through the enhanced inventory, it was verified that the wellheads and surface seals of the wells are maintained and in good condition. Also, there was a well vent for each well and the casing heights of the wells extend at least 12-inches above the wellhouse floors. The wells are located outside of the 100-year floodplain, decreasing the chance of contaminants being drawn into the drinking water source by surface water flooding. However, due to insufficient well log information for Well #1 and Well #2, it could not be determined if the depth of the well casing and annular seal extend into low permeable units, two important aspects of proper well construction. For Well #3, the annular seal does not extend into a low permeability unit.

The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all public water systems to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead and if the well is designed to yield greater than 50 gallons per minute (gpm) a minimum of a 6-hour pump test is required. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, whether the casing and annular space is within consolidated material or 18 feet below the surface, the thickness of the casing, etc. If all criteria are not met, the public water source does not meet the IDWR Well Construction Standards. In this case, there was insufficient information available to determine if the wells meet all the criteria outlined in the IDWR Well Construction Standards.

Potential Contaminant Source and Land Use

The potential contaminant sources and land use within the delineated zones of water contribution are assessed to determine the well's susceptibility. When agriculture is the predominant land use in the area, this may increase the likelihood of agricultural wastewater infiltrating the ground water system. Agricultural land is counted as a source of leachable contaminants and points are assigned to this rating based on the percentage of agricultural land. The land use within the area surrounding the City of Montpelier wells is predominately urban that transitions to mostly non-irrigated agricultural land as the distance from the well increases.

In terms of potential contaminant source and land use the susceptibility ratings are as follows. Well #1 and #2 rated moderate for IOCs (i.e. nitrates), VOCs (i.e. petroleum products), and SOCs (i.e. pesticides), and low for microbial contaminants (bacteria). Well #3 rated low for IOCs and microbial contaminants and moderate for VOC and SOC contaminants. The number and location of potential contaminant sources within the delineation contributed to the scores.

Final Susceptibility Ranking

A detection above a drinking water standard (MCL), any detection of a VOC or SOC, or having potential contaminant sources within 50 feet of the wellhead will automatically give a high susceptibility rating to the final well ranking despite the land use of the area because a pathway for contamination already exists. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) contribute greatly to the overall ranking.

Table 4. Summary of City of Montpelier Susceptibility Evaluation

Drinking Water Source	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Potential Contaminant Source Inventory and Land Use				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	H	M	M	M	L	M	H	H	H	H
Well #2	H	M	M	M	L	M	H*	H*	H*	H*
Well #3	M	L	M	M	L	L	H*	H*	H*	H*

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H* = automatic high due to potential contaminants existing within well's 50 foot sanitary setback distance. Well #2 contained irrigation pipe and Highway 30, Well #3 contained two sewer lines.

Susceptibility Summary

The IOCs fluoride and nitrate have been detected in all three wells, although the reported concentrations of these chemicals were below the MCL for each chemical. No VOCs or SOCs have been detected in any of the wells.

In terms of total susceptibility, Well #1 rated high for IOCs, VOCs, SOCs, and microbials. System construction scores were moderate and hydrologic sensitivity scores were high. Potential contaminant inventory and land use scores were moderate for IOCs, VOCs, SOCs, and low for microbials.

In terms of total susceptibility, Well #2 rated automatically high for IOCs, VOCs, SOCs, and microbials. System construction scores were moderate and hydrologic sensitivity scores were high. Potential contaminant inventory and land use scores were moderate for IOCs, VOCs, SOCs, and low for microbials. The automatically high ratings were due to the presence of an irrigation pipe and Highway 30 in the sanitary setback distance (50 feet) of the well.

In terms of total susceptibility, Well #3 rated automatically high for IOCs, VOCs, SOCs, and microbials. System construction scores were moderate and hydrologic sensitivity scores were high. Potential contaminant inventory and land use scores were low for IOCs, moderate for VOCs and SOCs, and low for microbials. The automatic high ratings were due to the presence of a road and sewer pipes within the sanitary setback distance of the well.

As no well logs were available for Well #1 and Well #2 during the analysis, any rating derived from information on a well log automatically defaulted to a higher score. If the well logs would have been available, system construction and hydrologic sensitivity scores for the two wells might have been lower.

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed source water protection program will incorporate many strategies. For City of Montpelier, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). No potential contaminants (pesticides, paint, fuel, cleaning supplies, etc.) should be stored or applied within 50 feet of the wells. Land uses within most of the source water assessment area are outside the direct jurisdiction of the City of Montpelier, making collaboration and partnerships with state and local agencies, industrial and commercial groups should be established to ensure future land uses are protective of ground water quality.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation contains some urban and residential land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the U.S. EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, Caribou Soil Conservation and Water District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office (208) 236-6160

State DEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper
(208) 343-7001 mlharper@idahorualwater.com Idaho Rural Water Association, for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund@ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

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Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environment Managers, 1997. "Recommended Standards for Water Works."

Idaho Division of Environmental Quality Ground Water Program, October 1999. Idaho Source Water Assessment Plan.

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Attachment A

City of Montpelier Susceptibility Analysis Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

1. System Construction		SCORE			
Drill Date	Unknown				
Driller Log Available	NO				
Sanitary Survey (if yes, indicate date of last survey)	YES	2000			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		6			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	16	17	20	4
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8
Sources of Class II or III leacheable contaminants or	YES	10	10	10	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		12	12	12	8
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		19	19	19	10
4. Final Susceptibility Source Score		14	14	14	14

5. Final Well Ranking			High	High	High	High

Ground Water Susceptibility Report   Public Water System Name: CITY OF MONTPELIER   Public Water System Number 6040021   WELL #2

1. System Construction		SCORE
Drill Date	Unknown	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	2000
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
	Total System Construction Score	4

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
	Total Hydrologic Score	6

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	YES	YES	YES	YES
	Total Potential Contaminant Source/Land Use Score - Zone 1A	2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	6	4	6	3
(Score = # Sources X 2) 8 Points Maximum		8	8	8	6
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
4 Points Maximum		1	1	1	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
	Total Potential Contaminant Source / Land Use Score - Zone 1B	9	9	9	6
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
	Potential Contaminant Source / Land Use Score - Zone II	3	3	3	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	

		IOC	VOC	SOC	Microbial
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		16	16	16	8
4. Final Susceptibility Source Score		13	13	13	13
5. Final Well Ranking		High	High	High	High

Ground Water Susceptibility Report Public Water System Name: CITY OF MONTPELIER Public Water System Number 6040021 WELL #3

1. System Construction		SCORE
Drill Date	08/13/1960	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	2000
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	YES	0
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		3

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	0
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	YES	0
Total Hydrologic Score		3

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	YES	YES	YES	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	0	4	4	0
(Score = # Sources X 2) 8 Points Maximum		0	8	8	0
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		0	8	8	0
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	

Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		7	15	15	2
4. Final Susceptibility Source Score		7	9	9	7
5. Final Well Ranking		High	High	High	High